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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,289	04/20/2004	Tomohiro Sugimoto	2004_0587A	2658

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EXAMINER	
KITOV, ZEEV V	

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/827,289	SUGIMOTO ET AL.	
	Examiner	Art Unit	
	Zeev Kitov	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges a submission of the amendment and arguments filed on January 3, 2006. Claims 1 and 4 are amended. Applicant's Arguments have been given careful consideration but they have been found non-convincing. An Office Action follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Hobbs (US 4,857,818), Lange et al. (US 5,786,685) and Unterlass et al. (US 5,392,184). Regarding Claims 1 and 4, AAPA discloses following elements of the Claim: a rectifier circuit for converting into a DC power a first AC power inputted from an AC power supply, which includes a diode bridge (element 6 in Fig. 5) and a reactor (element 9 in Fig. 5) connected to an AC input side of the diode bridge and having a small inductance, with the diode bridge having a plurality of first driver elements (diodes 2 – 5 in Fig. 5); an inverter (element 10 in Fig. 5) converting the DC power from the rectifier circuit into a second AC power so as to output the second AC power to a motor (element 11 in Fig. 5), which includes a plurality

of second driver elements (IGBT's in Fig. 5); a capacitor (element 7 in Fig. 5) absorbing regenerative energy of the motor, which is connected between DC buses of the inverter and has a small capacitance. It further discloses the overvoltage protection circuit (elements 36, 37 and 38 in Fig. 9) connected between the DC buses of the inverter in parallel with the capacitor. However, the disclosed overvoltage protecting circuit is not of the type, which is activated prior to breakdown of the diode bridge elements. Hobbs discloses the overvoltage protecting circuit (element 50 in Fig. 1) connected between the DC buses (+ and – lines extending from rectifying bridge 18 in Fig. 1) in parallel with the capacitor (element 19 in Fig. 1, col. 4,lines 56 – 62) thus protecting the circuit from high voltage transients caused by the collapse of the magnetic field in the motor on shutdown. The overvoltage protecting circuit is inherently being activated prior to breakdown of the first driver elements of the diode bridge (diodes of bridge 18 in Fig. 1); otherwise it would not be able to protect the circuit including the bridge. In the circuit of AAPA Fig. 5, the overvoltage protecting circuit will be activated prior to the breakdown of the second driver elements of the inverter, since as well known in the art, speed of varistor reaction is fast enough to protect semiconductor elements from breakdown. As to a capacitor value, the AAPA discloses the prior art capacitor (element 7 in Fig.5) as being small capacitance capacitor (see Drawings listing, page 7, lines 7 – 9).

Both references have the same problem solving area, namely driving the motor by invertors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the AAPA solution by replacing the regenerative transistor (element 37 in Fig. 9) by the varistor according to Hobbs,

because (1) as Hobbs states (col. 4, lines 56 – 62), the semiconductor elements of the inverter and rectifier should be protected against breakdown from high voltage transients caused by the collapse of the magnetic field in the motor on shutdown and (2) the varistor solution is simpler and has lower cost than AAPA Fig. 9, since it is one element only solution and the voltage detecting circuit (38 in Fig. 9) and switch control circuit (39 in Fig. 9) are not necessary.

Another reference, Unterlass et al., is intended to illustrate a varistor characteristics and its behavior when it is connected in parallel to the capacitor. Since the varistor is a non-linear resistive element, so at predetermined voltage amplitude, the varistor very quickly begins conducting current and thus protects the capacitor from long-duration overload conditions (col. 4, lines 4 – 29). When the voltage across the capacitor (and the varistor) reaches the predetermined value (according to the varistor characteristics), the varistor substantially reduces its resistance thus absorbing the current, which otherwise would charge the capacitor to a higher voltage value.

Additionally, the primary reference does not disclose charging the capacitor up to a voltage lower than its breakdown voltage. Lange et al. disclose charging the capacitor up to a voltage lower than the rating voltage (col. 9, line 44 – col. 10, line 14). Both references have the same problem solving area, namely charging the capacitor through rectifier and limiting the capacitor voltage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the AAPA solution by limiting the capacitor charging voltage such that it would not exceed the capacitor rating (or even worse) breakdown voltage. It is done so according

to widely used in Electrical Engineering design rule of derating, i.e. setting the voltage of the capacitor or any other electronic component lower than its nominal rating voltage indicated by the manufacturer. The motivation for such setting is to increase its MTBF (mean time before failure) value, which is the main indicator of the component reliability. Violation of this rule reduces the component reliability and in the case that the charging voltage exceeds the component breakdown voltage it would be violation of basic design rules and standards.

Regarding Claims 2 and 5, Hobbs discloses the overvoltage protecting circuit formed by a surge absorber (element 50 in Fig. 1, col. 4, lines 56 – 62). As to motivation for modification of the primary reference, it is the same as above.

Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Hobbs, Lange et al. and Ruckman (US 4,571,656). As was stated above, AAPA), Hobbs and Lange et al. disclose all the elements of Claim 1. However, regarding Claims 3 and 5, they do not disclose a surge absorber and a gas arrester connected in series. Ruckman disclose the surge absorber and the gas arrester connected in series (elements 34 and 32 in Fig. 1). Both references have the same problem solving area, namely providing an overvoltage protection to the electrical equipment. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the AAPA solution shown in Fig. 5 and 9 by adding the gas arrester in series with the surge absorber according to Ruckman, because as Ruckman states (col. 1, lines 44 - 58), the

varistor has faster response time than the gas discharge tube and high power dissipation, while the gas discharge tube has the slower response time and the higher energy absorption; therefore their combination shown in Fig. 1 combines both fast speed response and high energy absorption.

Response to Arguments

1. Applicant in his arguments alleges that after replacement of the transistor with the varistor 50 of Hobbs, "such a combination still would not suggest the above-noted correspondence between the charging voltage of the capacitor and the flowing of regenerative current through the overvoltage protecting circuit" (page 6, 1st paragraph). And further: "while utilizing the varistor 50 of Hobbs in the circuit of Fig. 9 of the present application would arguably provide a way to protect the circuit in Fig. 9 from high voltage transients, such a combination would not suggest to one of ordinary skill in the art that regenerative current should flow through varistor 50 upon the capacitor of Fig. 9 reaching a preset voltage such that the charging voltage of the capacitor is set lower than its breakdown voltage".

As is stated in Claim 1 rejection, according to Hobbs, the varistor (50 in Fig. 1) is used "to protect the circuit from high voltage transients caused by the collapse of the magnetic field in the motor on shutdown" (col. 4, lines 60 – 62). The protected circuit includes the capacitor (19 in Fig. 1). A combination of varistor and capacitor of Hobbs in the aspect is analogous to the AAPA circuit. As to the regenerative current flowing through varistor upon capacitor reaching a preset voltage, according to Unterlass et al.,

since the varistor is a non-linear resistive element, so that at predetermined voltage amplitude, the varuistor very quickly begins conducting current and thus protects the capacitor from long-duration overload conditions (col. 4, lines 4 – 29). When the voltage across the capacitor (and the varistor) reaches the predetermined value (according to the varistor characteristics), the varistor substantially reduces its resistance thus absorbing the current, which otherwise would charge the capacitor to a higher voltage value.

2. Examiner agrees with the notion: "mere disclosure of derating a capacitor's voltage would not suggest to one of ordinary skill in the art that a circuit should be provided that includes the direct correspondence between the charging voltage of a capacitor and the regenerative current flow through an overvoltage protecting circuit" Page 7, 1st and 3rd paragraphs). However, Examiner has never suggested that. The recited statement mischaracterizes the Examiner's position.

The Lange et al. reference is used in the rejection to demonstrate a widely used in the designer's community design rule of derating the voltages applied to the part with respect to the rating voltage value indicated by a manufacturer. Lange et al. disclose charging the capacitor up to a voltage lower than the rating voltage (col. 9, line 44 – col. 10, line 14). It is done so according to the widely used design rule of derating, i.e. setting the voltage of the capacitor or any other electronic component lower than its nominal rating voltage indicated by the manufacturer. The motivation for such setting is to increase its MTBF (mean time before failure) value, which is the main indicator of the component reliability. Violation of this rule reduces the component reliability and in

the case that the charging voltage exceeds the component breakdown voltage it would be violation of basic design rules and standards.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

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